Isolation and characterization of endoglucanases produced by microbes residing in the gut of Coptotermes curvignathus termite

ABSTRACT

Bacteria and enzymes in the gut of termites play an important role to digest lignocellulosic material. Coptotermes curvignathus is one of the very few destructive species that can infest living plants. In this study, five bacteria isolated from C. curvignathus gut; four aerobic Bacillus spp. and an anaerobic uncultured bacterium were identified to produce endoglucanase with molecular size of 11 kDa which is significantly smaller than the endoglucanase produced by Reticulitermes speratus. Biolog reader identification showed that TG117 and N45/1 were Bacillus cereus/thuringiensis, TG111 was Bacillus pseudomycoides and TG005 was Bacillus mycoides. Endoglucanase produced by aerobic isolate NA45/1 showed promising potential as an industrial enzyme with significantly higher enzymtic activity than the commercial cellulase from Aspergillus Niger (C1184 Sigma). Endoglucanase NA45/1 displayed enzymatic activity 0.3961 U at pH 9 and 45°C. The endoglucanase TG111 acted optimally at alkaline condition with 0.2294 U whereas endoglucanase TG117 functioned best at slightly acidic condition. This study showed that the termite gut has a wide range of endoglucanase enzymes with various optimum temperatures and pH.

Keyword: Endoglucanases; Microbes; Coptotermes curvignathus